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ELECTRONIC DESTINATION DISPLAY DEVICE  
[Denshishiki kosen hyoji sochi]

Hitomi Kumakazi

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INVENTOR	(72):	KUMAZAKI, HITOMI
APPLICANT	(71):	RICOH CO., LTD.
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[Claim 1] An electronic destination display device provided with inputting means for digitally inputting destination display information, means for storing the destination display information, a means for digitally displaying the inputted destination display information, a means for selecting prescribed information from out of the displayed destination display information, and an expansion control means for displaying said information on the aforesaid display means as an expanded display when the prescribed information is selected by the aforesaid selecting means.

[Claim 2] An electronic destination display device provided with inputting means for digitally inputting destination display information, means for storing the destination display information, a display means for digitally displaying inputted destination display information, a selecting means for selecting prescribed information out of the displayed destination display information, an expansion ratio inputting means for inputting an expansion ratio, and an expansion control means for displaying said information as an expanded display on the aforesaid display means in accordance with the expansion ratio inputted by the aforesaid expansion ratio inputting means when the prescribed information is selected by the aforesaid selecting means if prescribed information is selected by the selecting means.

[Claim 3] An electronic destination display device provided with inputting means for digitally inputting destination display information, means for storing destination display information, a display means for

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\* Number in the margin indicates pagination in the foreign text.

digitally displaying inputted destination display information, a selecting means for selecting prescribed information out of displayed destination display information by a remote operation, distance measuring means for measuring the distance between said selecting means and the aforesaid display means, an expansion ratio determining means for determining an expansion ratio in accordance with the measured distance, and an expansion control device for displaying said information on the aforesaid display means as an expanded display in accordance with the expansion ratio determined by the aforesaid expansion ratio setting means.

[Detailed Specifications]

[0001] [Field of Industrial Application]

The present invention relates to an electronic destination display device, such as a bulletin board, for displaying the destination of each individual belonging to a certain group and other information.

[0002] [Prior Art]

One destination display device is installed for a certain group composed of a plurality of people. Meanwhile, the size of the characters and symbols displayed on a conventional destination display device were fixed.

[0003] [Problems to be Solved by the Invention]

Consequently, it may be difficult for a member of the group in a room who thinks he/she wants to see the noticeboard of a conventional destination display device to see this noticeboard from his/her position due to his/her eyesight and the distance from the noticeboard. In such a case, it was necessary for this person to move to a distance where the display could be seen, which caused a hindrance such as temporary interruption

of one's job.

[0004] Vis-à-vis, although a display of large characters and the like can be performed, it is not suitable to increase the size of the characters and the like or to lessen the amount of information, from the standpoint of the kind of the noticeboard where a large amount of information is displayed temporarily on a limited display area.

[0005] It is an object of the present invention to provide an electronic destination display device for displaying characters and the like on a noticeboard temporarily as an expanded display according to the instruction command of a member in the room.

[0006] [Means for Solving the Problems]

The 1<sup>st</sup> invention of this application is an electronic destination display device provided with inputting means (21, 25 to 27) for digitally inputting destination display information, means (313, 314) for storing the destination display information, a means (18) for digitally displaying the inputted destination display information, a means (2) for selecting prescribed information from out of the displayed destination display information, and an expansion control means (30) for displaying the information thereof on the display means (18) as an expanded display when the prescribed information is selected by the selecting means (2).

[0007] Moreover, the reference symbols in the brackets above denote corresponding elements or corresponding items shown in the drawings below.

[0008] The 2<sup>nd</sup> invention of the present application is an electronic destination display device provided with inputting means (21, 25 to 27) for digitally inputting destination display information, means (313, 314)

for storing the destination display information, a display means (18) for digitally displaying inputted destination display information, a selecting means (3) for selecting prescribed information out of the displayed destination display information, an expansion ratio inputting means (3) for inputting an expansion ratio, and an expansion control means (30) for displaying the information thereof as an expanded display on the display means (18) in accordance with the expansion ratio inputted by the expansion ratio inputting means (3) when the prescribed information is selected by the selecting means (3).

[0009] The 3<sup>rd</sup> invention of this application is an electronic destination display device provided with inputting means (21, 25 to 27) for digitally inputting destination display information, means (313, 314) for storing destination display information, a display means (18) for digitally displaying inputted destination display information, a selecting means (4) for selecting prescribed information out of displayed destination display information by a remote operation, distance measuring means (4e to 4g) for measuring the distance between the selecting means (4) and the display means (18), an expansion ratio determining means (301) for determining an expansion ratio in accordance with the measured distance, and an expansion control device (18) for displaying the information thereof on the display means (18) as an expanded display in accordance with the expansion ratio determined by the expansion ratio setting means (301) if prescribed information is selected by the selecting means (4).

[0010] [Effects]

According to the 1<sup>st</sup> invention, the expansion control means (30) displays information as an expanded display on the display mean (18) when prescribed information is selected out of the destination display information displayed on the display mean (18) by the selecting means (2); hence, if the selecting means (2) is used in a remote operation, with a remote control or the like, each member in the room has the ability to obtain information easily without needing to get out of one's seat and approach the display means (18) at a distance at which the display can be read. In addition, by performing a display with large characters, usually the amount of information is not condensed.

[0011] According to the 2<sup>nd</sup> invention, the expansion control means (30) displays information on the display mean (18) as an expanded display in accordance with the expansion ratio if prescribed information out of destination display information displayed on the display mean (18) and the expansion ratio are selected by the selecting means (3); hence, the display can be expanded according to the expansion ratio, depending on the selection circumstances by the member in the room, and an even easier-to-read display can be obtained.

[0012] According to the 3<sup>rd</sup> invention, the expansion control means (30) displays information as an expanded display on the display mean (18) in accordance with the expansion ratio determined automatically from the measured distance between the selecting means (4) and the display mean (18) if prescribed information out of the destination display information displayed on the display mean (18) is selected by the selecting

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means (2) which performs selection in a remote operation; hence, an even easier-to-read display can be obtained by a simple operation.

[0013] Other objects and features of the present invention will be apparent from the following descriptions of the practical example with reference to the drawings.

[0014] [Practical Example 1]

An example of the destination display device of the present invention is composed of the destination noticeboard main body **1** shown in Fig. 1 and a remote control switch **2** used for expanding display shown in Fig. 2.

[0015] With reference to Fig. 1, the destination noticeboard main body **1** is composed of, among other parts, a display panel **10** which performs a destination display, a destination selection panel **20** having a built-in destination display selection switch **21** corresponding to each destination to select a destination for which a destination code has been generated depending on the respective switch thus pushed, a main power supply indicator **22** for indicating that the main power supply has supplied power to the noticeboard, a display ON/OFF switch **23** for lighting/putting out just the display portion of this destination noticeboard, a main power supply switch **24** for turning the main power supply ON/OFF, a numeral input ten-key pad **25** for inputting and setting a return home time and a telephone number on the display portion, a time setting mode switch **26** for mode setting use which handles data as time data using the numeral input ten-key pad **25**, a telephone number setting mode switch **27** for setting a mode for handling data as data for exhibiting the telephone number by means of the numeral



input ten-key pad **25**, and a destination data registration panel **28**.

[0016] Moreover, operation of the display ON/OFF switch **23** is composed of a momentary switch as a toggle operation. When it is pushed once, the display goes off and if it is pushed once again, it goes on, with the going off and on being repeated each time it is pushed after that. The internal display data is held until the main power supply is disconnected, irrespective of the state of this display ON/OFF switch **23**.

[0017] In the display panel **10**, **16** is a part indicating display items, with items **11** to **15** being shown. That is, **11** means "name" which indicates a name; **12** means "arrive/leave" which indicates the arriving/leaving of a member in the room; **13** means "arrival time" which indicates the time the member gets to work; **14** means "destination" which indicates a destination place; **15** means "telephone number" which indicates a telephone number for communicating with the destination, respectively. **17** is a part displaying the names of each member in the room; **18** is a flat panel display (LCD indicator) which displays the contents of these items. Although an LCD is used in this practical example, there is no problem if it is some other kind of flat panel display, such as an LCD, EL or FV. The display portions in addition to this LCD indicator **18** are not parts that change substantially over time; hence, they are displayed in this practical example by being filled in or printed in. Consequently, the display portion in addition to the LCD indicator **18** on this destination noticeboard are filled in or printed in while in a livingroom or the like.

[0018] **19** is a name selection switch/indicator for generating a corresponding name and number if a switch is pressed depending on the name, and moreover, the indicator goes on to indicate that a name and number has been selected.

[0019] With reference to Fig. 2, the remote control switch **2** used for expanding display is a switch used for inputting a display expansion command in an optic remote control operation; it is provided with an item selection key **2a** for selecting an item for expansion. This item for expansion corresponds the name of each member in the room to the part **17** displaying the name of each member in the room shown in Fig. 1.

[0020] The LCD display layout of the LCD indicator **18** (one 1-person portion) is shown in Fig. 3. This is composed of a "arrive/leave display portion" (16\*16 dot matrix\*1) **181**, for displaying an arrive/leave, a "time display portion" (8\*16 dot matrix \*5) **182** for displaying the time one arrives, a "destination display portion" (16\*16 dot matrix \*4) **183** for displaying a destination, a "telephone number display portion" (8\*16 dot matrix \*11) **184** for displaying a telephone number, and the like. Although spaces provided between the information, e.g., between rows and between characters for ease of seeing, an LCD also is used in the parts with those spaces related to displaying expanded characters. A standard arrangement of the characters is predetermined, which is stored in ROM to be referenced while the content in memory for LCD display use is displayed on the LCD.

[0021] An outline of the configuration of the electrical circuit of the present invention is shown in Fig. 4. **30** is a control circuit, which controls each switch/indicator and controls the function of the

noticeboard. The LCD indicator **18**, name selection switch/indicator **19**, destination display selection switch **21**, display ON/OFF switch **23**, numeral input ten-key pad **25**, time setting mode switch **26**, telephone number setting mode switch **27**, destination data registration panel **28**, and remote control switch **2** are connected respectively to the control circuit **30**. In addition, **32** is a power supply device, which supplies DC power to the control circuit **30** after inputting a general commercial AC 100V power supply. In addition, the main power supply indicator **22** and main power supply switch **24** are connected to this power supply device **32**. **33** is an AC power supply supplied to the power supply device **32**.

[0022] The remote control switch **2** used for expanding display is composed of the item selection key **2a** for selecting an item for expansion, a keyboard driver **2b** which outputs a selection signal depending on the selected key connected to the item selection key **2a**, an electrooptical conversion section **2c** which emits light after converting an electric signal outputted from the keyboard driver **2b** to an optical signal. Moreover, an example in which the remote control switch **2** used for expanding display performed an optical remote control input was shown, but there are no hindrance at all even if the signal transmission part thereof is inputted sonically, or even if it is an electric signal inputted though the terminal of each person in a network connected to the noticeboard.

[0023] The configuration of the control circuit **30** is shown next. **301** is a so-called microcomputer LSI which controls the overall circuit. **302** is work RAM which stores data used by a program temporarily. **303**

is program ROM in which programs are stored to operate the overall control circuit. **304** is a kanji [Chinese characters] CG (character generator) ROM in which bit pattern data is stored for displaying kanji and ANK /600 characters on the LCD indicator **18**. **305** to **310** are I/O ports. The I/O port **305** inputs the switch push-button information for the name selection switch/indicator **19** and outputs indicator display information. The I/O port **306** inputs the push-button information for the numeral input ten-key pad **25**. The I/O port **307** inputs the push-button information for the time setting mode switch **26** to set the numeral input data temporarily. The I/O port **308** inputs the push-button inputs press-button information for the telephone number setting mode switch **27** to set the numeral input data in the telephone number. The I/O port **309** inputs the press-button information from the destination display selection switch **21**. The I/O port **309** inputs the press-button information from the destination display selection switch **21**. The I/O port **310** inputs/outputs the information for the destination data registration panel **28**. **311** is an LCD display memory in which the bit pattern of the LCD display pattern is stored as is. **312** is an LCD driver which transfers the contents of the LCD display memory **311** to the LCD indicator **18** and also drives the LCD itself. In addition, the LCD indicator **18** also goes on/off by means of the display ON/OFF switch **23**. **313** is a destination display mode table, which stores various data used during the operation for displaying the destination of each member in the room. **314** is a destination registration mode table, which stores various data used when registering destination data to be

displayed. **315** is a photoelectric converter, which is provided with light-receiving elements that receive the light outputted from the remote control switch **2** and convert the light data thus received to electric signal data. **316** inputs/outputs information converted to an electric signal by means of the photoelectric converter **315**.

[0024] An example of the destination display mode table **313** is shown in Fig. 5. Figure 5(a) is a destination table composed of various columns: "name and number," "name selection flag," "numeral input mode," "destination code," "arrival time," and "telephone number" corresponding to the display data in the LCD indicator **18**. The "name and number" indicates the item corresponding to the name selection switch **17**. The "0" "name selection flag" indicates Disable and the "1" "name selection flag" indicates Enable.

In this case, Enable indicates that the individual destination code, arrival time, and telephone number of the applicable name and number. "Numeral input mode" is a flag for discriminating if the ten-key input data is time data or telephone number data, with "0" indicating a time input and "1" indicating a telephone number input. "Destination code" indicates a destination corresponding to each name. "Telephone number" indicates a contact corresponding to each destination.

[0025] Figure 5(b) is a destination code table showing a relationship between each code in the "destination code" column in Fig. 5(a) and actual destination data and telephone numbers. The destination contents here are stored as kanji codes (the kanji codes having the meanings shown in the brackets in the drawing). In addition, each destination code has a relationship with a destination selection switch.

[0026] The processing contents for the display expansion operation of the microcomputer LSI **301** are shown in Fig. 6. Moreover, the general method for the destination display operation is the same as a conventional method; hence, it is omitted here.

[0027] The expansion operation processing consists of: (2) performing an expansion display processing for expanding a display if there is an input selected by the remote control switch **2** (step 1; the word "step" is omitted hereafter in the parentheses) and (3) perform a standard display processing where the display is restored to the standard size. Moreover, the input from the remote control switch **2** used for expanding display is such that the operator selects the key from among the item selection keys **2a** corresponding to the person he/she wants to have the information thereof expanded for, and if he/she presses the noticeboard, the corresponding signal is sent to the noticeboard as an optical signal.

[0028] The contents of the remote control switch **2** in Fig. 6 are shown in Fig. 7. In this processing, the display on the LCD indicator **18** is cleared (21) and the name selection switch/indicator **19** of the column of the selected name flashes (22). Then, the destination table shown in Fig. 5 is referenced (23) and the information of the selected item is re-expanded in the kanji CG ROM **304** (Figure 4) (24). The size of the expanded characters during re-expansion and the program in the program ROM **303** are prestored so that the display position thereof is as shown in Fig. 9. While referencing the information in the expanded mode, expansion into a bit pattern is performed, after which the LCD indicator **18** goes on in accordance with that pattern and an expanded display is performed

(25).

[0029] The contents of the selecting means (3) in Fig. 6 are shown in Fig. 8. In this processing, the display is restored to standard size after a fixed amount of time has elapsed after display has been expanded. That is, the length of time from the start of the expanded display is measured by a clock built into the microcomputer LSI **301**. If a fixed length of time has elapsed (31), the display on the LCD indicator **18** is cleared (32), and the name selection switch/indicator **19** of the column with the selected name goes off (33). Next, while referencing the destination table (34), the contents that are numerals are re-expanded to 8\*16 bit patterns in the kanji CG ROM **304**; otherwise, kanji, hiragana [Japanese cursive syllabary], and so forth are re-expanded into 16\*16 bit patterns, depending on the information in the standard mode shown in Figure 9 (35). In accordance with this pattern, the LCD indicator **18** goes on and a standard display is performed (36). Moreover, when an expanded display command of the other contents is inputted during the expanded display (contents of other names and numbers), the existing display is cleared and rewritten as the new display contents thus indicated; hence, this routine does not shift to the existing display.

[0030] Thus, when a respective member tries to obtain information on the noticeboard and the display thereof is difficult to see, he/she selects the information he/she wants to expand on the destination noticeboard from among the buttons of a remote control, and expanded information he/she wants to see is displayed merely by pressing the noticeboard. For example, the information in Fig. 10(b) is the result of a certain member in the

room sending a command, "wants to expand Mr. Suzuki information," from among the information displayed as a standard display, as in Fig. /601 10(a). In this practical example, the expansion mode is set to 4X.

[0031] [Practical Example 2]

Although an expanded display was performed at the predetermined expansion ratio if the information the member wanted to expand was inputted using the remote control switch **2** for display expansion use in Practical Example 1, in Practical Example 2, in addition to the input of the information the member wants to expand, the expansion ratio also is selected and inputted therewith.

[0032] The destination noticeboard main body **1** and control circuit **30** are the same as in Practical Example 1. The aspects that differ from Practical Example 1 include the appearance of the remote control switch **2** used for expanding display shown in Fig. 2 that is switched to the one in Fig. 11(a), the circuit configuration of the remote control switch **2** used for expanding display shown in Fig. 4 that is switched to the one in Fig. 11(b), the expanded display processing shown in Fig. 7 that is switched to the one in Fig. 12, and the program in the kanji CG ROM **304** shown in Fig. 9 that is switched to the one in Fig. 13, respectively. Moreover, a description of the aspects that are the same as those in Practical Example 1 will be omitted.

[0033] With reference to Fig. 11, the remote control switch **3** used for expanding display as shown in Figure 11(a) is provided with an item selection key **3a** for selecting the item to be expanded and an expansion ratio selection key **3d** for selecting an expansion ratio. The item for



expansion corresponds to the part **17** displaying the name of the respective member in the room shown in Fig. 1, and moreover, the expansion ratio corresponds to four patterns: 1.00X, 2.25X, 4.00X and 5.64X.

[0034] The circuit of the remote control switch **3** used for expanding display, as shown in Fig. 11(b), is composed of an item selection key **3a**, an expansion ratio selection key **3d**, a keyboard driver **3b** connected to the item selection key **3a** and expansion ratio selection key **3d** to output the selection signal depending on the selected key, and an electrooptical converting section **3c** which converts the electric signal outputted from the keyboard driver **3b** to emit light. Moreover, an example of the remote control switch **3** used for expanding display in which a remote control input was performed optically was shown, but as in Practical Example 1, the signal transmission section thereof is not hindered at all even when the signal transmission part thereof is a sonic input or and electric signal inputted from the terminal of each individual connected to the noticeboard by a network.

[0035] The contents of the expanded display processing are shown in Fig. 12 next. If an item for expansion and expansion rate are selected, and an optical signal outputted from the remote control switch **3** used for expanding display is received, the display on the LCD indicator **18** is cleared (21b) and the selected name selection switch/indicator **19** in the name column flashes (22b). Next, by referencing the destination table shown in Figure 5 (23b), the information of the selected item is re-expanded in the kanji CG ROM **304** (Fig. 4). The size **m\*n** of the expanded character during re-expansion, and the display start coordinate position thereof

are stored along with the programs in the program ROM 303, and while referencing the information of the selected expansion ratio, expansion of the bit pattern is performed. The LCD indicator 18 goes on in accordance with the pattern thereof and an expanded display is performed (24b, 25b). Although processing for a standard display is performed by restoring the display to standard size after a fixed length of time has elapsed, this routine is the same as the one shown in Practical Example 1 (Fig. 8).

[0036] Thus, to obtain the information on the noticeboard, the respective member in the room selects an expansion ratio together from the remote control buttons in addition to the information he/she wants to expand on the destination noticeboard when the display thereof is difficult to see, and upon pressing the noticeboard, the information he/she wants to see is obtained at the expansion ratio depending on the circumstances.

When the noticeboard is seen from a position slightly further away, the size can be adjusted to a suitable display the size of the character by the member in the room when observing the display at a small expansion ratio. For example, as shown in Fig. 10(a), the information in Fig. 10(b) is the result from a certain member in the room sending a command, "I want to expand the information for Mr. Suzuki," from among the information displayed as a standard display and a command for a 4.00X expansion ratio by pressing the noticeboard.

[0037] [Practical Example 3]

In Practical Example 3, the distance between the remote control switch 4 is measured if the information one wants to expand is inputted by means of the remote control switch 4 used for expanding display, and a display

is performed at an expansion ratio corresponding to said measurement distance.

[0038] The appearance of the destination noticeboard main body **1** and the remote control switch **4** used for expanding display, and the control circuit **30** are the same as those in Practical Example 1. The aspects that differ from Practical Example 1 are that the circuit configuration of the remote control switch **2** used for expanding display shown in Fig. 4 is switched to the one in Fig. 14 and the expanded display processing shown in Fig. 7 is switched to the one shown in Fig. 16, respectively, and a processing for measuring the distance to the destination noticeboard is added. Moreover, a description of the aspects that are the same as those in Practical Example 1 will be omitted.

[0039] With reference to Fig. 14, the circuit of the remote control switch **4** used for expanding display is comprised of an item selection key **4a**, keyboard driver **4b**, which is connected to the item selection key **4a** and outputs the selection signal depending on the selected key, an electrooptical converter **4e** provided with a light emitter for measuring the distance between the remote control switch **4** and the destination noticeboard, a photoelectric converter **4f** provided with a light-receiving element, a CPU **4g** which performs a processing for calculating the distance between the remote control switch **4** and the destination noticeboard according to the length of time light is reflected and processing to output a signal depending on the input, a RAM **4h** in which the selection signals and selected distance signals are accumulated temporarily, and an electrooptical

converter **4c** which emits light by converting the contents in RAM **4h** to optical signals. Moreover, an example in which the remote control switch **4** performed a remote control input optically was shown, but the signal transmission part thereof is not hindered at all even if the input is a sonic one.

[0040] The processing contents of the CPU **4g** are shown in Fig. 15. If the operator selects the item selection key corresponding to the name and number and presses the keyboard (41), a signal corresponded by the keyboard driver **4b** is outputted (42). The information thereof is stored temporarily in RAM **4h** (43) and light is emitted to measure the distance from the electrooptical converter **4e** (44). If the light thereof is reflected by the noticeboard, the photoelectric converter **4f** receives the reflected light thereof and converts it to electric signals (45). The CPU **4g** /602 outputs light emission signals to calculate the distance between the remote control switch **4** and the destination noticeboard according to the time difference when the reflected light was inputted. Moreover, the time depends on the passage of the internal clock of the CPU **4g**. The computed distance signal is stored temporarily in RAM **4h** (47). The selection information and distance information are read out from RAM **4h** and these two pieces of information are sent to the noticeboard converted to optical signals by the electrooptical converter **4c** (48).

[0041] The contents of the expanded display processing are shown in Fig. 16 next. If the light (light having a predetermined wavelength) signal including the selection information of the item for expansion

outputted from the remote control switch **4** used for expanding display and the distance information is received, the distance information is determined from the table (Fig. 17) in which the corresponding expansion ratio is prestored in program ROM **303** (20c). The display on the LCD indicator **18** is cleared (21c), the name selection switch/indicator **19** flashes in the selected name column (23c), and the information of the selected item is re-expanded by the kanji CG ROM **304** (Fig. 4) at the scale factor determined in step 20c. The size  $m \times n$  of the expanded character during re-expansion and the display start coordinate position thereof are prestored with the programs in program ROM **303**, as shown in Fig. 13, and while referring to the selected expansion ratio information, the LCD indicator **18** goes on and expanded display is performed in accordance with the pattern thereof (24c, 25c). After that, the standard display processing for restoring the display to standard size is performed after a fixed length of time has elapsed, although this routine is the same as the one shown in Practical Example 1 (Fig. 8).

[0042] To conveniently obtain the information on the noticeboard accordingly, the respective member in the room selects the information he/she wants to expand on the destination noticeboard when the display thereof is difficult to see from among the remote control buttons, and automatically determines the expansion ratio for obtaining an easy-to-read display between the remote control and the distance to the noticeboard just by pressing the noticeboard. For example, when a certain board member sends a command, "I want to expand the information of Mr. Suzuki," from among the information displayed as a standard display, as shown in Fig.

10(a), to the noticeboard, it is judged from the distance of this member in the room that a 4X expansion is suitable (when the range of distance is 5 m to 8 m), the information in Figure 10(b) is displayed.

[0043] [Advantages of the Invention]

As described above, according to the 1<sup>st</sup> invention, if the selecting means (2) is used in a remote operation with, e.g., a remote control, a respective member in the room can obtain information with ease without getting out of his/her seat and needing to approach the display means (18) at a distance the display can be read. Moreover, performing a display with large characters usually does not condense the amount of information.

[0044] In addition, according to the 2<sup>nd</sup> invention, the display is expanded in an expansion region depending on the circumstances selected by the board member; hence, an even easier-to-read display is obtained.

[0045] In addition, according to the 3<sup>rd</sup> invention, prescribed information is displayed as an expanded display on the display means (18) corresponding to the expansion ratio determined automatically from the measured distance between the selecting means (4) and the display means (18) is displayed as an expanded display in a prescribed length time; hence, and even easier- to-read display is obtained easily.

[Brief Description of the Drawings]

[Figure 1] is an external view showing the destination noticeboard main body **1** constituting an example of the present invention.

[Figure 2] is an external view showing the remote control switch **2** used for expanding display use of Practical Example 1 constituting an example of the present invention.

[Figure 3] is a block diagram showing a display layout of the LCD indicator **18** shown in Fig. 1.

[Figure 4] is a block diagram showing a configuration outline of the electrical circuit of the present invention.

[Figure 5] shows an example of the contents of the table **313** for destination display mode shown in Figure 4; (a) is a block diagram showing the data of a destination table and (b) is a block diagram showing a destination code table.

[Figure 6] is a flowchart showing a portion of the processing operation of the microcomputer LSI shown in Fig. 4.

[Figure 7] is a flowchart showing the contents of the expanded display processing (2) of Practical Example 1.

[Figure 8] is a flowchart showing the contents of the standard display processing (3) shown in Fig. 6.

[Figure 9] is a block diagram showing an example of the contents program determining the starting position and the size of the display data in Figure 1 of the program ROM **303** shown in Fig. 4.

[Figure 10] shows an example of the display contents of the LCD indicator **18** shown in Fig. 1; (a) is a block diagram showing a standard display and (b) is a block diagram showing an expanded display.

[Figure 11] shows the remote control switch **3** used for expanding display use of Practical Example 2 constituting an example of the present invention; (a) is an external view and (b) is a block diagram showing a configuration of the electrical circuit.

[Figure 12] is a flowchart showing the contents of the expanded display processing (2) of Practical Example 2 shown in Fig. 6.

[Figure 13] is a block diagram showing an example of the contents of a program determining the start position and the size of the display data of Practical Example 2 of the program ROM **303** shown in Fig. 4.

[Figure 14] is a block diagram showing a configuration of the electrical circuit of the remote control switch **4** used for expanding display used of Practical Example 3 constituting an example of the present invention.

[Figure 15] is a flowchart showing the contents of the processing of the CPU **4g** shown in Fig. 14.

[Figure 16] is a flowchart showing the contents of the expanded display processing (2) of Practical Example 3 shown in Fig. 6.

[Figure 17] is a block diagram showing an example of the contents of the program determining the scale factor of the display data of the program ROM **303** shown in Fig. 4 with respect to the range of distances in Practical Example 3.

[Explanation of the Codes]

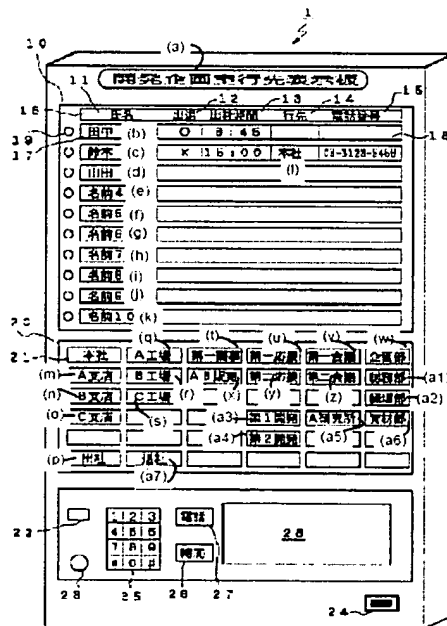
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1: destination noticeboard main body; 2: remote control switch used for expanding display (selecting means); 2a: item selection key; 2b: keyboard driver; 2c: electrooptical conversion section; 3: remote control switch used for expanding display (selecting means, expansion ratio inputting means); 3a: item selection key; 3b: keyboard driver; 3c: electrooptical converting section; 3d: expansion ratio selection key; 4: remote control switch used for expanding display (selecting means); 4a: item selection key; 4b: keyboard driver; 4c: electrooptical converter; 4e: electrooptical



converter; 4f: photoelectric converter; 4g: CPU; 4h: RAM (4e to 4g: distance measuring means); 10: display panel; 18: LCD display (display means); 19: name selection switch/indicator; 20: destination selection panel; 21: destination display selection switch; 22: main power supply indicator; 23: display ON/OFF switch; 24: main power supply switch; 25: numeral input ten-key pad; 26: time setting mode switch; 27: telephone number setting mode switch (21, 25 to 27: inputting means); 28: destination data registration panel; 30: control circuit (expansion control means); 32: power supply device; 33: AC; 301: microcomputer LSI expansion ratio determining means); 302: work RAM; 303: program ROM; 304: kanji CG ROM; 305 to 310: I/O ports; 311: LCD display memory; 312: LCD driver; 313: table for destination display mode (storage means); 314: destination registration mode memory (storage means); 315: photoelectric converter; 316: I/O port

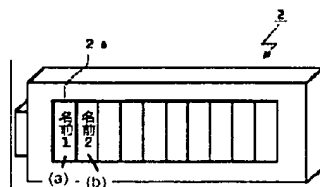
[Figure 1]



Key: (a) Development and Planning Office Destination Noticeboard; (11) name; (12) arrive/leave; (13) leave; (14) destination; (15) telephone number; (21) company name; (26) time; (27) telephone; (b) Tanaka; (c)

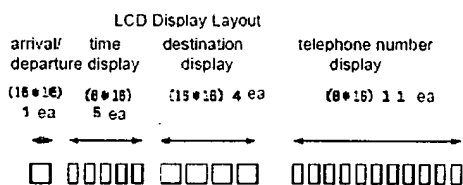
Suzuki; (d) Yamada; (e) name 4; (f) name 5; (g) name 6; (h) name 7; (i) name 8; (j) name 9; (k) name 10; (l) this company; (m) branch A; (n) branch B; (o) branch C; (p) arrive; (q) plant A; (r) plant B; (s) plant C; (t) 1<sup>st</sup> trade; (u) 1<sup>st</sup> reception; (v) 1<sup>st</sup> conference; (w) planning office; (x) store AB; (y) 2<sup>nd</sup> reception; (z) 2<sup>nd</sup> conference; (a1) [illegible]; (a2) [illegible]; (a3) 1<sup>st</sup> development; (a4) 2<sup>nd</sup> development; (a5) laboratory A; (a6) [illegible] office; (a7) leave

[Figure 2]

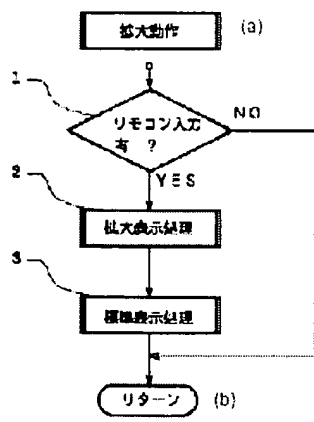


Key: (a) name 1; (b) name 2

[Figure 3]



[Figure 6]



Key: (a) expansion operation; (1) Is there remote control input?; (2) expansion display processing; (3) standard display processing (b) return

[Figure 9]

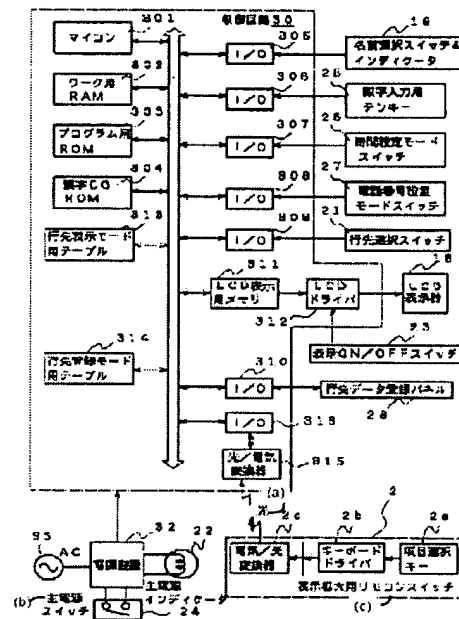
(f)	(a)	(b)	(c)	(d)	(e)
標準	文字間隔	到達(O, X)	到着時間(数字)	行先(漢字)	電話番号(漢字)
標準	2418	(30, 30), 18x18	(48, 30), 8x18	(56, 40), 18x18	(178, 30), 9418
拡大	4432	(28, 40), 32x32	(68, 40), 18x32	(80, 60), 22x32	(23, 130), 32x32

(g) Provided "・" is a coordinate denoting start position of respective data (unit: dots); "m'n" after that denotes size of characters expressing data.

Key: (a) Character Spacing; (b) Arrive/Leave (o,x); (c) Time of arrival (numerals); (d) Destination (kanji); (e) Telephone Number (kanji); (f) Standard; (g) Expansion

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[Figure 4]



Key: (301) microcomputer; (302) work RAM; (303) program ROM; (304) kanji CGROM; (313) table for destination display mode; (314) table for destination registration mode; (30) control circuit; (311) LCD display memory; (315) photoelectric converter; (18) name selection switch/indicator; (25) numeral input ten-key pad; (26) time setting mode switch; (27) telephone number setting mode switch; (21) destination selection switch; (312) LCD driver; (18) LCD indicator; (23) display ON/OFF switch; (28) destination data registration panel; (a) light; (32) power supply device; (2c) electrooptical conversion section; (2b) keyboard driver; (2c) item selection key; (b) main power supply switch; (24) main power supply switch; (2) remote control switch used for expanding display; (c) remote control switch for display expansion use

[Figure 5]

(a) 行先テーブル

名前番号	名前番号フラグ	数値入力モード	行先コード	山形時間	電話番号
名前1	0	0	01	1800	8200
名前2	1	-	01	1500	8207
名前3	0	-	50	0830	
名前4	0	-	50	0830	
名前5	0	-	02	0830	
名前6	0	-	50	0830	
名前7	0	-	50	0830	
名前8	0	-	50	0830	
名前9	0	-	50	0830	
名前10	0	-	50	0830	

Key: (a) destination table

Name and number	Name and number Flag	Numerical Input Mode	Destination Code	Telephone Number
Name 1			[this company]	
Name 2			[branch A]	
Name 3			[branch B]	
Name 4				
Name 5			[branch C]	
Name 6				
Name 7				
Name 8			[leave work]	
Name 9				
Name 10				

(b) destination table

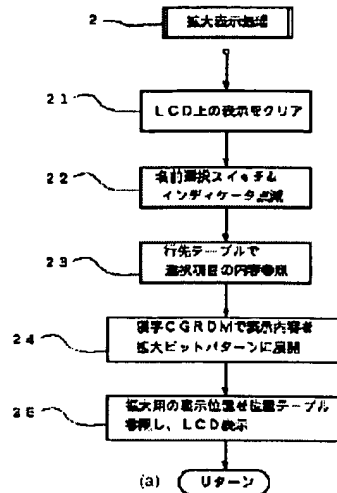
行先コード	行先内容	電話番号
01	[本社]	09-818-1455
02	[A支店]	
03	[B支店]	
04	[C支店]	
05		
06	[工場]	
21	[A工場]	
22	[B工場]	
23	[C工場]	
24		
25		
26	[通社]	
77		

only number of destination selection switch

Key: (b) destination code table

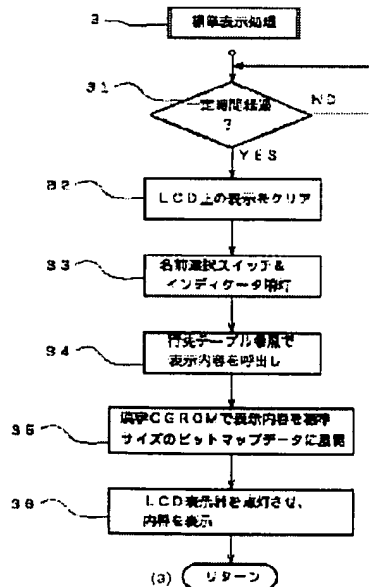
Destination Code	Destination Contents	Telephone Number
	[this company]	
	[branch A]	
	[branch B]	
	[branch C]	
	[leave work]	

[Figure 7]



Key: (2) expanded display processing; (21) clear display on LCD; (22) name selection switch indicator flashes; (23) reference contents of selected item in destination table; (24) expand display contents to expanded bit pattern by kanji CGRDM; (25) reference display position for expanding in position table; (a) return

[Figure 8]



Key: (2) standard display processing; (31) fixed time elapsed?; (32) clear display on LCD; (33) name selection switch/indicator goes off; (34) page display contents by referencing destination table; (35) expand display contents by kanji CGRDM to standard size bit pattern data; (38) LCD indicator flashes and contents are displayed; (a) return

[Figure 10]

(a)

Name	arrive/ leave	time arrive at work	destina- tion	telephone number
Tanaka	□	8:45		
Suzuki	x	15:00	arrive/ leave	03-3123-3456
Yamada	○	8:00	work at this company	



expanded 4X

(b)

Name	arrive/ leave	time arrive at work	destina- tion	telephone number
Tanaka				
● Suzuki	x	15:00	Away from work	03-3123-3456
Yamada				

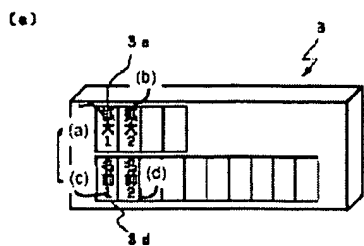
[Figure 17]

距離範囲 (m)	乗率
0以上3未満	1.00
3以上5未満	2.25
5以上8未満	4.00
8以上	5.84

Key:

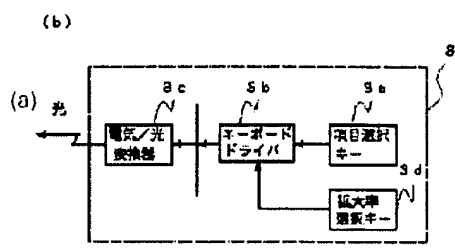
Range of distances (m)	Scale Factor
0 to 3	
3 to 5	
5 to 8	
≥8	

[Figure 11]



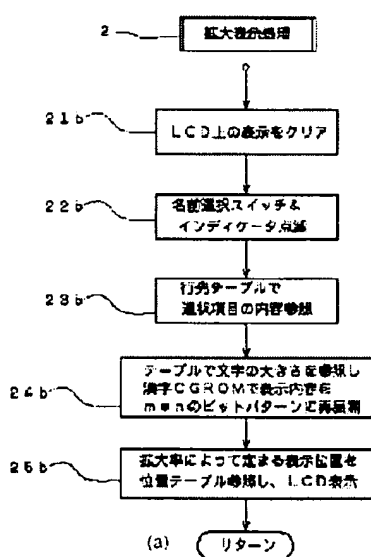
(a)

Key: (a) expansion 1; (b) expansion 1; (c) name 1; (d) name 2



(b)

Key: (a) light; (3c) electrooptical converter; (3b) keyboard driver; (3a) item selection key; (3d) expansion ratio selection key



Key: (2) expanded display processing; (21b) clear display on LCD; (22b) name selection switch/ indicator flashes; (23b) reference contents of selected item in destination table; (24b) refer to character size in table and re-expand display contents to  $m \times n$  data pattern by kanji CGROM; (25b) reference display position determined by expansion ratio in position table; LCD display; (a) return

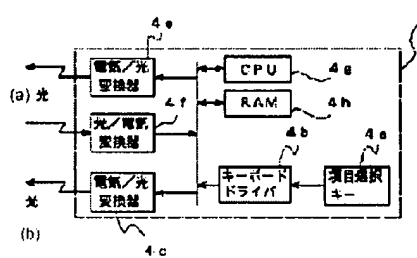
[Figure 13]

(a)	(b)	(c)	(d)	(e)	(f)
最大値	文中間隔	出退(O, X)	出退時間(分・秒)	行先(漢字)	電話番号(漢字)
1. 11	2=16	(22, 30), 15=16	(40, 30), 0=16	(60, 30), 1=16	(1 16, 30), 0=16
1. 21	3=24	(22, 40), 24=24	(30, 40), 12=16	(150, 40), 24=24	(32, 70), 12=14
4. 11	4=32	(22, 40), 32=32	(30, 40), 12=32	(10, 40), 32=32	(24, 30), 32=32
5. 11	5=38	(22, 50), 38=38	(70, 30), 50=38	(10, 40), 38=38	(24, 30), 38=38

Provided, however, that the numbers in the parentheses of the respective data (unit: dots); m'n after that denote character size expressing data as dots.

Key: (a) expansion ratio; (b) character spacing; (c) arrive leave (o, x); (d) time arrive at work (expanded); (e) destination (kanji); (f) (telephone number (kanji)

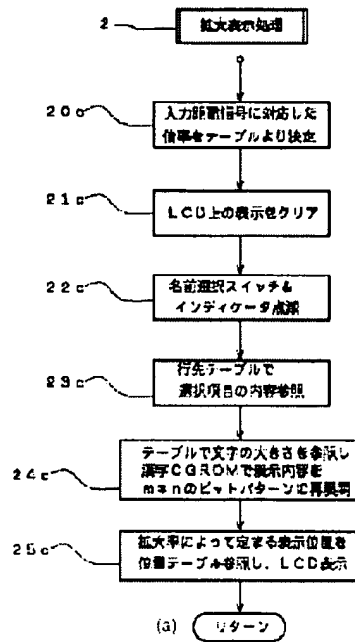
[Figure 14]



Key: (a) light; (b) light; (4e) electrooptical converter; (4f) photoelectric converter; (4c) electrooptical converter; (4b) keyboard driver; (4a) item selection key

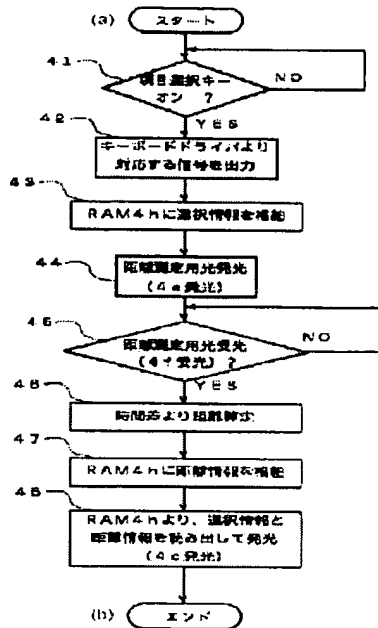


[Figure 15]



Key: (2) expanded display processing; (20c) determine scale factor corresponding to input distance signal from table; (21c) clear display on LCD; (22c) name selection switch/indicator flashes; (23c) reference contents of selected item in destination table; (24c) reference character size in table and re-expand display contents by kanji CGROM to  $m \times n$  bit pattern; (25c) reference display position determined by expansion ratio in position table; LCD display; (a) return;

[Figure 16]



Key: (a) start; (41) is item selection key on?; (42) reference selection information in RAM 4h; (43) store selection information in RAM 4h; (44) light emitted to measure distance (4e: emit light); (45) light received to measure distance (4f: receive light)?; (46) measure distance by time difference; (47) store distance information in RAM 4h; (48) read out selection information and distance information by RAM 4h (4c light emitted); (b) end

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